
SENSIT[®] IRED

INFRARED ETHANE DETECTOR



INSTRUCTION MANUAL

READ AND UNDERSTAND INSTRUCTIONS BEFORE USE



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FOR YOUR SAFETY



NOTICE: This safety symbol is used to indicate a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



WARNING: To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing in an area known to be free of combustible gases.



WARNING: Charge battery pack in an area known to be free of combustible gases.



WARNING: Use only SENSIT Technologies battery pack.



WARNING: Service may only be performed by factory authorized service technicians.



WARNING: Not for use in environments greater than 21% oxygen.



WARNING: Read and understand instructions prior to use.



WARNING: Always start the IRED in an area known to be gas free.



WARNING: Tampering with this product may void the warranty.



WARNING: Use only SENSIT Technologies approved parts and accessories.



WARNING: Never use an instrument known to be damaged, operating unusually, or out of calibration.

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PARTS AND ACCESSORIES

STANDARD PARTS (INCLUDED)

Compact Carrying Case	872-00021
Telescopic Survey Probe	883-00029
Instrument Handle Strap	360-00464
Hot Swap Vehicle Battery	871-00030
Universal Wall Charger	871-00025
Battery Door Removal Tool	360-00249
Hydrophobic Filter Ring Assembly (10 pack)	873-00033
Survey Probe Filter (Blue) (1 filter)	360-00064
Instruction Manual	750-00061

For IREDs equipped with GPS:

SmartLink Log Viewer Software	870-00040
SmartLink Installation Guide	750-00051

CALIBRATION

IRED Calibration Kit	881-00100
Kit Includes:	
(1) Regulator, (1) Cal Adapter	
(1) 100 ppm Ethane / Nitrogen 58L	
100 ppm Ethane 58L replacement cylinder	315-120010
IRED Bump Test Kit	881-00101
Kit Includes:	
(1) Regulator, (1) Cal Adapter,	
(1) 1000 ppm Methane / 10 ppm Ethane 58L	
1000 ppm Methane / 10 ppm Ethane 58L	315-120005

See the accessories catalog on our website, www.gasleaksensors.com, for other accessories and replacement parts.

PRODUCT AND TECHNOLOGY DESCRIPTION

The SENSIT Infrared Ethane Detector, referred to as IRED, is designed to detect the presence of ethane gas in a methane gas sample. The IRED can detect 250 parts per billion (ppb) up to 500 ppm ethane. The IRED is used to determine if methane detected in the range of 50 – 2400 ppm is of similar make-up to that of pipeline gas (which contains ethane) or is naturally occurring methane from other sources such as organic decay. The IRED is not designed for high concentrations or determining actual ethane content from within a pipeline.

The IRED senses gas using Infrared (IR) Absorption Spectroscopy in combination with an electronic narrow bandpass filter. This technology utilizes an infrared light source with an output that is changed when certain gases absorb the light output. The filter only allows specific light wavelengths to be monitored and measured. The concentration of gas is proportional to the amount of specific IR light absorbed and is displayed in ppb or ppm concentrations.

The IRED has a large display indicating both sustained and peak reading concentrations and other instrument functions. An internal pump provides rapid sampling into the detection chamber. Bluetooth data transmission provides communication of stored data. Optional GPS with Data Logging allows for further recording of time, data, and location data.



TO OPERATE:

1. Press Power
2. Wait for Automatic Zeroing
3. Begin to Use

Patented



PRODUCT FEATURES

- The IRED is constructed of durable ABS plastic.
- The housing is designed to meet IP54 ingress protection.
- The rechargeable battery pack is designed for easy field replacement and charging.
- Calibration can be done either manually or with the Smart-Cal station.
- External hydrophobic filters are inexpensive and easy to change.
- The user interface is simple, easy to navigate, and will be familiar to users of other SENSIT products.
- Optional GPS gives latitude and longitude location coordinates for each field measurement.
- Measurement, calibration, and bump test results are all stored in internal memory that can be printed with an IR printer or downloaded using SmartLink Software.
- Built-in Bluetooth communication provides an easy and convenient way to retrieve data from the IRED when used with SmartLink Software.

USER INTERFACE

The user interface on the IRED includes the following features:

- LCD
- Three button operation
- LED status indicators
- Sounder
- Photo cell for automatic backlighting
- IR communication port



SPECIFICATIONS

OPERATIONAL SPECIFICATIONS

Temperature:	-4°F to 122°F (-20°C to 50°C)
Duty Cycle:	6 hours
Test Time:	40 seconds (after warm-up and zeroing)
Display:	Visual – backlight display Visual – concentration, test status, instructional prompts Visual – failure indicators
Power:	Lithium Ion rechargeable battery pack Optional vehicle charger adapter
Pump Flow:	1.0 lpm
Sample Size Range:	50 – 2400 ppm methane

PHYSICAL SPECIFICATIONS

Size:	11.625" x 5.25" x 8.275" (approximate) (11.6cm x 13.3cm x 21.3cm)
Weight:	7.41 lbs (3.36 kg)
Construction:	Aluminum/ABS plastic

SENSOR SPECIFICATIONS

IR Sensor:	Method: advanced infrared absorption spectroscopy
Detection range:	250 ppb – 500 ppm ethane
Warmup time:	< 30min
Calibration required:	3 months

EXTERNAL FEATURES

BATTERY PACK AND CHARGING

The battery pack for the IRED is located on the back side of the instrument housing. The batteries are Lithium Ion rechargeable and only available from SENSIT Technologies.

To remove the battery pack, turn the retaining screws ¼ turn. Pull the bottom of the pack away from the main housing. The battery pack may be charged while still in the housing, but the instrument will not be able to be used during this time.

To re-install the battery pack into the instrument, slide the top tabs of the battery pack into the retainers at the top of the main housing. Push the bottom into place and turn and lock the retaining screws.

The battery pack has LEDs to indicate charge status. Charging should only be performed in an area known to be free of combustible gases.

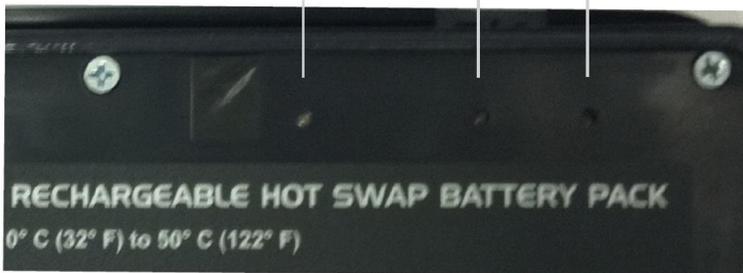
The battery pack may also be charged while operating in a vehicle. Connect the 12 VDC adapter into the vehicle power outlet and the external port on the battery housing. This can be connected and disconnected while the IRED is operating.

When the charger is disconnected, the words **WARM UP PLEASE WAIT** (flashing) are displayed and a 180 second countdown is started and shown on screen. The user cannot perform a measurement until the countdown expires. The instrument will only operate when on battery power.



Status (Yellow) Charging (Red) Charge Complete (Green)

Charger Connection On Other Side



HANDLE STRAP / SHOULDER STRAP ATTACHMENTS

The IRED comes standard with a handle strap to make carrying the instrument more convenient. A shoulder strap is also available. The straps clip onto two “D” rings on the sides of the IRED.

GAS INLET AND OUTLET

The gas inlet and outlet are located on the front of the main housing. Both are fitted with ¼ turn luer-style connections for easy connection to probes or other accessories.

The inlet is the center fitting, and is attached to the filter cap which houses the hydrophobic filter assembly (see next section). The outlet is towards the side of the instrument. Do not block the outlet.

HYDROPHOBIC FILTER ASSEMBLY

WARNING: Do not operate the IRED without a proper filter installed, or with a filter that is damaged or completely saturated with liquid. Damage may occur to the pump or other internal components.

The inside of the IRED is protected by a hydrophobic filter. This filter should always be in place when the instrument is in use. There are two different styles of filters for the IRED, depending on when the instrument was manufactured.

The old style filter has an adhesive ring that sticks to the filter base. Instruments manufactured before January of 2017, and that have a black filter cap, use the old style filter.

The new style filter uses a gasket and O-ring to seal properly. Instruments manufactured during or after January of 2017, and that have a white filter cap, use the old style filter.



OPERATION AND USE

POWER ON AND STARTUP SEQUENCE

To power on the IRED, press and hold the POWER (A) button until the display illuminates. The following warmup sequence will occur on the display:

- Display SENSIT logo
- System check
- Display serial number, software revision, date and time
- Flow check
 - If the flow check is successful, **PASSED** will be displayed.
 - If the flow check is unsuccessful, ensure that nothing is obstructing the inlet or exhaust, and check the integrity of the hydrophobic filter.
- Warmup is indicated by **PLEASE WAIT** with a 600 second countdown timer. The countdown timer will begin after an initial warmup of ~5 minutes.
- Cell check
 - This is a 5 step process that tests the integrity of the internal cell, and takes 7-8 minutes to complete. The process is automatic and does not require any user input.
 - Clean air
 - Methane cell in
 - Temperature adjustment
 - Methane cell in
 - Clean air
 - If the cell check fails, restart the instrument. If the process is unable to successfully complete, service is required.
- Calibration due date indicating when calibration will need to be done or **PAST DUE** indicating calibration date has been exceeded. If calibration is required:
 - Pressing the **A** button will turn off the instrument.
 - Pressing the **B** button will begin the calibration process.
 - Pressing the **C** button will skip past the calibration required message to continue warm up. This option is password protected.
- [If activated] Auto Bump test function to validate sensitivity to ethane
 - Pressing the **A** button will turn off the instrument.
 - Pressing the **B** button will begin the bump test process (see the [Bump Test section](#) in this manual).
 - Pressing the **C** button will skip past the bump test requirement to continue warmup.
- Working mode display indicated by **READY FOR MEASUREMENT** on the display and ready LED being illuminated.

FIELD USE - MEASUREMENT

- 1) Before taking a measurement, it is recommended to perform a flow block check to ensure the sampling system of the IRED and any probe that will be attached is intact and doesn't have any leaks. To perform a flow block check:
 - a) Ensure the instrument is on the **READY FOR MEASUREMENT** screen. Attach the probe that will be used for sampling (telescopic survey or bar hole probe) to the inlet of the IRED.
 - b) Block all inlets of the probe with either your finger(s)/hand. In the case of a bar hole probe, it may be easier to use something like a latex/nitrile glove or a balloon to more easily seal all inlets. You should hear the pump begin to labor and **FLOW BLOCKED** should be displayed after a few seconds.
 - c) If **FLOW BLOCKED** is not displayed, the probe may have a leak. Inspect all connections, fittings, and any O-rings, and try again. If still not displayed, remove the probe from the instrument and block the inlet of the IRED directly. If still not displayed, inspect the filter cap assembly of the IRED, ensure it is threaded onto the base correctly, and replace the filter/O-ring as necessary.
 - d) If **FLOW BLOCKED** cannot be achieved after the above steps, the IRED should be serviced.
- 2) From the **READY FOR MEASUREMENT** display, press and release the **B** button to start a measurement. Before a measurement can be taken, the zeroing process must complete.
 - a) Apply air known to be free of methane or ethane gas (i.e. ambient, clean air. Do not sample from where you want to take a measurement.). The pump must be on, do not turn it off.
 - b) Press and release the **B** button to accept. **SAMPLING CLEAN AIR** will be displayed along with sensor output information. These numbers are only used for troubleshooting purposes should an issue occur.
 - c) The internal cell, containing methane, is introduced into the light path inside the instrument. **METHANE CELL IN** will be displayed. If the reading is not stable the zeroing process will automatically re-initiate, indicated by **RE-ZEROING** being displayed. This process may repeat one or more times until a stable reading is achieved, indicated by **PLEASE BEGIN SAMPLING** being displayed along with a 120 second countdown timer, as well as an audible tone. The measurement must be started before the countdown expires, or a new zero will need to be established.

NOTE: The zeroing process may be needed up to 10 times. A successful zero is saved as the starting point for the next required zero, so in general less zeroing will be needed the more often the IRED is used. If the IRED cannot zero successfully after 10 attempts, an error message will be displayed. Contact SENSIT for assistance.
- 3) Place the end of the probe in the area to be tested.
- 4) Press the **B** button to start the measurement within the countdown time indicated on screen (120 seconds).
- 5) The measurement is indicated by **MEASUREMENT** being displayed. During measurement, 4 consecutive 10 second readings are taken. The display will be updated every 10 seconds with this reading until 40 seconds has elapsed. The final reading is indicated by **RESULT** being displayed. The real-time/average reading will be displayed on the left side of the screen and the peak reading will be displayed on the right. Press and release the **A** button to exit or the **C** button to print the result to an IR printer.
 - a) During the measurement, if the concentration of methane is too large (above 2400 ppm), **BACKGROUND TOO HIGH** will be displayed. Dilute the sample by drawing in more air, which can usually be achieved by slightly moving the probe away from the source.

PRINTING WITH THE IR PRINTER

All measurements the IRED takes are automatically saved in the Measurement Log. These can be retrieved at any time with SmartLink Software (included). See the [SmartLink Software](#) section in this manual for more information. Another option to obtain a record of a measurement is to print it using the IR printer. This option is only available directly after a measurement, while on the **RESULT** screen.

To print a measurement result:

- 1) Turn on the IR printer and aim it at the IR window of the IRED (oval window on the right side of the display) at a distance of about 6 inches or 15 cm.
- 2) On the IRED, press and release the **C** button to begin printing.

POWER DOWN AND STANDBY

To either power the IRED down or put it into standby mode (reduced battery consumption), press and hold the **A** button from the ready for measurement screen. **SHUT DOWN** and **STAND BY** will be shown on the display.

Press and release the **A** button to start the shutdown process. The instrument will purge for a set amount of time (10 seconds by default), and then power off.

Press and release the **C** button to put the instrument in standby mode. Standby mode reduces battery consumption by putting the IRED in a low power state. To exit standby mode, press and release the **A** button. **WARMUP** will be displayed with a 3 minute countdown. The normal **READY FOR MEASUREMENT** screen will be displayed after the countdown expires.

BUMP TEST

MANUAL BUMP TEST

- 1) From the **READY FOR MEASUREMENT** screen, press and release the **C** button until **BUMP TEST** is displayed. Press and release the **B** button to select. Before the actual bump test begins, the unit will first go through a zeroing process:
 - a) Apply air known to be free of methane or ethane gas (i.e. ambient, clean air). The pump must be on, do not turn it off.
 - b) Press and release the **B** button to accept. **SAMPLING CLEAN AIR** will be displayed along with sensor output information. These numbers are only used for troubleshooting purposes, should an issue occur.
 - c) The internal cell, containing methane, is introduced into the light path inside the instrument. **METHANE CELL IN** will be displayed. If the reading is not stable the zeroing process will automatically re-initiate, indicated by **RE-ZEROING** being displayed. This process may repeat one or more times until a stable reading is achieved, indicated by **BUMP TEST 10 PPM ETHANE** being displayed, as well as an audible tone.

NOTE: The zeroing process may be needed up to 10 times. A successful zero is saved as the starting point for the next required zero, so in general less zeroing will be needed the more often the IRED is used. If the IRED cannot zero successfully after 10 attempts, an error message will be displayed. Contact SENSIT for assistance.
- 2) Prepare the bump test kit by screwing the regulator onto the cylinder of gas (10 ppm ethane / 1000 ppm methane, balance air). If you are using a demand regulator (standard with the bump test kit from SENSIT), leave the pump on. If you are using a positive pressure regulator, turn the IRED pump off by pressing and releasing the **C** button and turn the regulator on so that gas is flowing.
- 3) Attach the hose from the regulator to the inlet of the IRED.
- 4) Press and release the **B** button to start the bump test. After the reading has stabilized, the result will be displayed.
 - a) If successful, the result will display **PASSED**. Press and release the **A** button to return to the user menu. Press and release the **B** button to print.
 - b) If unsuccessful, press and release the **C** button to perform another bump test. If still unsuccessful, perform a calibration.

Bump test results are logged for later viewing and/or download. See the [SmartLink Software section](#) in this manual for more information.

SMART-CAL BUMP TEST

NOTE: To be compatible with the IRED, the Smart-Cal Station must have firmware version 3.05 or higher. The bump test gas (1000 ppm methane / 10 ppm ethane) should be attached to the blue port.

- 1) From the *READY FOR MEASUREMENT* screen, press and hold the *A* button for 1-2 seconds and release. *SMART-CAL* will be displayed.
- 2) Place the IRED in the SMART-CAL instrument cradle, with the battery side down and with the display facing towards the station.
- 3) Attach the instrument hose to the inlet of the IRED.
- 4) Press and release the right (*BUMP TEST*) button the station. The bump test process should begin.

CALIBRATION

MANUAL CALIBRATION

- 1) From the **READY FOR MEASUREMENT** screen, press and release the **C** button until **CALIBRATION** is displayed. Press and release the **B** button to select. Before the actual calibration begins, the IRED will first start the zeroing process:
 - a) Apply air known to be free of methane or ethane gas (i.e. ambient, clean air). The pump must be on, do not turn it off.
 - b) Press and release the **B** button to accept. **SAMPLING CLEAN AIR** will be displayed along with sensor output information. These numbers are only used for troubleshooting purposes should an issue occur.
 - c) The internal cell, containing methane, is introduced into the light path inside the instrument. **METHANE CELL IN** will be displayed. If the reading is not stable the zeroing process will automatically re-initiate, indicated by **RE-ZEROING** being displayed. This process may repeat one or more times until a stable reading is achieved, indicated by **CALIBRATING PLEASE APPLY 100 PPM ETHANE** being displayed, as well as an audible tone.
NOTE: The zeroing process may be needed up to 10 times. A successful zero is saved as the starting point for the next required zero, so in general less zeroing will be needed the more often the IRED is used. If the IRED cannot zero successfully after 10 attempts, an error message will be displayed. Contact SENSIT for assistance.
- 2) Prepare the calibration kit by screwing the regulator onto the cylinder of gas (100 ppm ethane, balance nitrogen). If you are using an on-demand regulator (standard with the calibration kit from SENSIT), leave the pump on. If you are using a positive pressure regulator, turn the IRED pump off by pressing and releasing the **C** button and if applicable turn the regulator on so that gas is flowing.
- 3) Attach the hose from the regulator to the inlet of the IRED.
- 4) Press and release the **B** button to start the calibration. After the reading has stabilized, the result will be displayed.
 - a) If successful, the result will display **PASSED**. Press and release the **A** button to return to the user menu.
 - b) If unsuccessful, press and release the **A** button to return to the user menu and attempt the calibration again from step 1a. If calibration cannot be successfully completed, the IRED may require service. Contact SENSIT Technologies for assistance.

Calibration results are logged for later viewing and/or download. See the [SmartLink Software section](#) in this manual for more information.

SMART-CAL CALIBRATION

NOTE: To be compatible with the IRED, the Smart-Cal Station must have firmware version 3.05 or higher, and be equipped with the “optional” (purple) port on the back of the station. The calibration gas (100 ppm ethane balance nitrogen) should be attached to the purple port.

- 1) From the **READY FOR MEASUREMENT** screen, press and hold the **A** button for 1-2 seconds and release. **SMART-CAL** will be displayed.
- 2) Place the IRED in the SMART-CAL instrument cradle, with the battery side down and with the display facing towards the station.
- 3) Attach the instrument hose to the inlet of the IRED.
- 4) Press and release the left (**CALIBRATE**) button the station. The calibration process should begin.

USER MENU

To access the user menu, press and release the **C** button from the *READY FOR MEASUREMENT* screen. The following features can be accessed from the user menu. Scroll through each item by pressing and releasing the **C** button. To select, press and release the **B** button. Pressing and releasing the **A** button will exit the menu.

WARNINGS

Shows any warnings that are present.

- 1) Bluetooth not communicating
- 2) GPS not communicating
- 3) Bump Test skipped
- 4) Calibration skipped

BUMP TEST

Allows user to perform a manual bump test. See the [Bump Test section](#) in this manual for more information.

CALIBRATION

Allows user to perform a manual calibration. See the [Calibration section](#) in this manual for more information.

VIEW BUMP LOG

Displays the bump test log on screen, sorted by date and time with the most recent log shown first. The bump log contains up to 100 records.

- 1) Press and release the **B** button to view the logs. If no log is shown when the **B** button is released, there are no logs to display.
- 2) Press and release the **B** button to view the previous record and/or the **C** button to view the next record.
- 3) Press and release the **A** button to return to the User Menu.

VIEW CAL LOG

Displays the calibration log on screen, sorted by date and time with the most recent log shown first. The cal log contains up to 100 records.

- 1) Press and release the **B** button to view the logs. If no log is shown when the **B** button is released, there are no logs to display.
- 2) Press and release the **B** button to view the previous record and/or the **C** button to view the next record.
- 3) Press and release the **A** button to return to the User Menu.

VIEW MEAS LOG

Displays the measurement log on screen, sorted by date and time with the most recent log shown first. The measurement log contains up to 1000 records.

- 1) Press and release the **B** button to view the logs. If no log is shown when the **B** button is released, there are no logs to display.
- 2) Press and release the **B** button to view the previous record and/or the **C** button to view the next record.
- 3) Press and release the **A** button to return to the User Menu.

ERASE MEAS LOG

Erases the measurement log. This option is password protected.

ACTIVATE GPS

Only available if GPS option is installed *and* currently deactivated.

NOTE: If an IRED is ordered with GPS, it should automatically activate upon power on.

Press and release the **B** button to activate GPS. **ACTIVATING PLEASE WAIT** will be displayed for a few seconds before returning to the User Menu.

SET TIME

- 1) Press and release the **B** button to enter the set time menu.
- 2) The hour field will be blinking. Press and release the **B** button to adjust (24 hour format). Press and release the **C** button to move to the minute field. Press and release the **B** button to adjust.
- 3) Once all fields are correct, press and release the **A** button to save and exit to the User Menu.

SET DATE

- 1) Press and release the **B** button to enter the set date menu.
- 2) The day field will be blinking. Press and release the **B** button to adjust. Press and release the **C** button to move to the next field.
- 3) Repeat step 2 for the month and year fields. If the year is too high, keep using the **C** button until **2050** is passed to wrap back around to **2000**.
- 4) Once all fields are correct, press and release the **A** button to save and return to the User Menu.

VIEW SETTINGS

Allows the user to view all settings saved on the instrument. This includes settings in the expert and factory menu.

- 1) Press and release the **B** button to view the settings.
- 2) Press and release the **C** button to scroll through each setting. The currently selected setting is indicated by >> displayed to the left. Press and release the **B** button to adjust the setting (password protected).
- 3) Press and release the **A** button to return to the User Menu.

EXPERT MENU

Access to the expert menu. Password protected. See the [Expert Menu section](#) in this manual for more information.

FACTORY MENU

Access to the factory menu. Password protected.

TEST MENU

Access to the test menu. Displays diagnostic information that the user normally doesn't need to see.

EXPERT MENU

The Expert Menu contains supervisor level settings related to the operation and use of the instrument. This menu is password protected. If you need to access something in the Expert Menu, contact SENSIT Technologies for assistance. The following features can be accessed in the Expert Menu:

CONTRAST

Default: 36

Sets the contrast of the display.

LANGUAGE

Default: English

Sets the language used throughout the user interface. The only language currently supported is English, as of the writing of this manual.

CAL FLOW

Calibration process for the internal pressure sensor, which is used for flow block indication. This is done at the factory and does not need to be recalibrated unless there is an issue.

ADVANCE CALIB

Advanced calibration process. This is done at the factory before the instrument is shipped and is not required to be done by the user.

CAL PPM

Default: 100 ppm

Sets the ethane gas concentration in ppm that is expected by the calibration process. Default of 100 ppm is the only calibration kit that SENSIT offers.

CAL INTERNAL

Default: 90 days

Calibration interval, set in number of days. After this number of days has passed since the last successful calibration, the user will be prompted to perform a calibration on startup, after the warmup process.

BUMP INTERVAL

Default: 0 (disabled)

Defines the interval for the "Auto Bump" feature, set in number of days. After this number of days has passed since the last successful bump test, the user will be prompted to perform a bump test on startup, after the warmup process.

BUMP PPM

Default: 10 ppm

Sets the ethane gas concentration in ppm that is expected by the bump test process. Default of 10 ppm is the only bump test kit that SENSIT offers.

BUMP L-LIMIT%

Default: 80%

Sets the lower limit for a successful bump test. With default options, this would be 8 ppm (80% of 10 ppm expected).

BUMP H-LIMIT%

Default: 120%

Sets the upper limit for a successful bump test. With the default options, this would be 12 ppm (120% of 10 ppm expected).

PURGE TIME

Default: 10 seconds

Sets the time in seconds that the IRED will purge before shutting off, after the user selects shut down.

ERASE BUMP LOG

Password protected. Erases the bump log.

ERASE CAL LOG

Password protected. Erases the calibration log.

ERASE MEAS LOG

Password protected. Erases the measurement log.

CELL CHECK

Starts the internal cell check process. This also runs after the warmup process after power on.

SCAL PUMP CH4

Default: disabled

Controls whether the pump is automatically enabled or disabled during a Bump Test when using the SMART-CAL Station. It should be enabled if using an on-demand regulator and disabled if using a positive pressure regulator.

SCAL PUMP C2H6

Default: disabled

Controls whether the pump is automatically enabled or disabled during Calibration when using the SMART-CAL Station. It should be enabled if using an on-demand regulator and disabled if using a positive pressure regulator.

USE IN CONJUNCTION WITH A PMD

With the use of a SENSIT IRED and PMD you can accurately and efficiently determine the percentage of ethane in a methane / natural gas sample between 50-2400 ppm. There are two methods to achieve the desired results which are outlined below. The picture below depicts the telescopic probe (bar hole probe may also be used) attached to the inlet of the IRED (with pump on) and the PMD (with pump off) inlet attached to the exhaust of the IRED. This allows both devices too simultaneously analyze the same sample. The IRED draws the sample in and then exhausts it directly into the PMD.

This is the preferred method, because it simultaneously analyzes the sample. This removes any inaccuracy due to the instruments measuring the sample at different times.



METHOD 1 – SIMULTANEOUS SAMPLE ANALYSIS

- 1) With the probe of choice attached to the inlet of the PMD (Pump On), search for an acceptable stable sample size ranging from 50-2400 ppm methane / natural gas.
- 2) Disconnect the probe tubing from the PMD (leave the probe in place). Turn the PMD pump off and attach the pairing hose to the IRED exhaust and the PMD inlet.
- 3) Start the zeroing process on the IRED. Upon the completion of the zero process, the IRED will beep and a 120 seconds countdown timer will be displayed.
- 4) Attach the probe of choice that is still in place from step 2 to the inlet of the IRED and press the **B** button to start the test. The test will last 40 seconds.
- 5) During the test, monitor the PMD methane readings. Note the peak methane reading during the 40 second test. This will be required to establish a ratio.
- 6) At the end of the test, the IRED will display **RESULT** and beep. The peak ethane reading will be displayed.
- 7) Based on the peak methane and ethane readings, reference the methane/ethane ratio chart provided in this section.
- 8) Repeat steps 1 through 7 to perform another analysis.

METHOD 2 - INDEPENDENT SAMPLE ANALYSIS

- 1) With the probe of choice attached to the inlet of the PMD, search for an acceptable stable sample size ranging from 50-2400 ppm methane / natural gas.
- 2) Start the zeroing process on the IRED. Upon the completion of the zero process, the IRED will beep and a 120 second countdown timer will be displayed.
- 3) Note the methane reading on the PMD. This will be required to establish a ratio. Disconnect the probe tubing from the PMD (leave the probe in place) and attach the probe to the inlet of the IRED. Press the **B** button on the IRED to begin the 40 second measurement.
- 4) At the end of the test, the IRED will display **RESULT** and beep. The peak ethane reading will be displayed.
- 5) Reference the methane/ethane ratio chart provided in this section.
- 6) Repeat steps 1 through 5 to perform another analysis.

METHANE/ETHANE RATIO CHART

The chart on the following page is a useful reference for determining if the results the IRED shows align with what concentration of ethane would be expected in your system gas. The vertical axis of the chart is the concentration of methane in ppm and the horizontal axis is the expected concentration of ethane in ppm, based on a percentage of the methane concentration. Ethane, being the identifier in natural gas, is purposefully injected at a specific ratio (e.g. 1%, 2%, etc.). This means that if 100% volume natural gas were analyzed, and the ethane ratio was 2%, the concentration of ethane in that gas would be 2% by volume. The IRED is designed to detect ethane in a methane sample of between 50-2400 ppm.

See the chart below for an example. If the methane concentration in the sample was determined to be around 350 ppm (using one of the two methods described on the previous page), and the ethane ratio in the system gas was known to be 3%, the expected ethane concentration in the sample would be around 10.5 ppm.

Methane PPM	1%	2%	3%	4%	5%
50	500 ppb	1	1.5	2	2.5
100	1	2	3	4	5
150	1.5	3	4.5	6	7.5
200	2	4	6	8	10
250	2.5	5	7.5	10	12.5
300	3	6	9	12	15
350	3.5	7	10.5	14	17.5
400	4	8	12	16	20
450	4.5	9	13.5	18	22.5
500	5	10	15	20	25

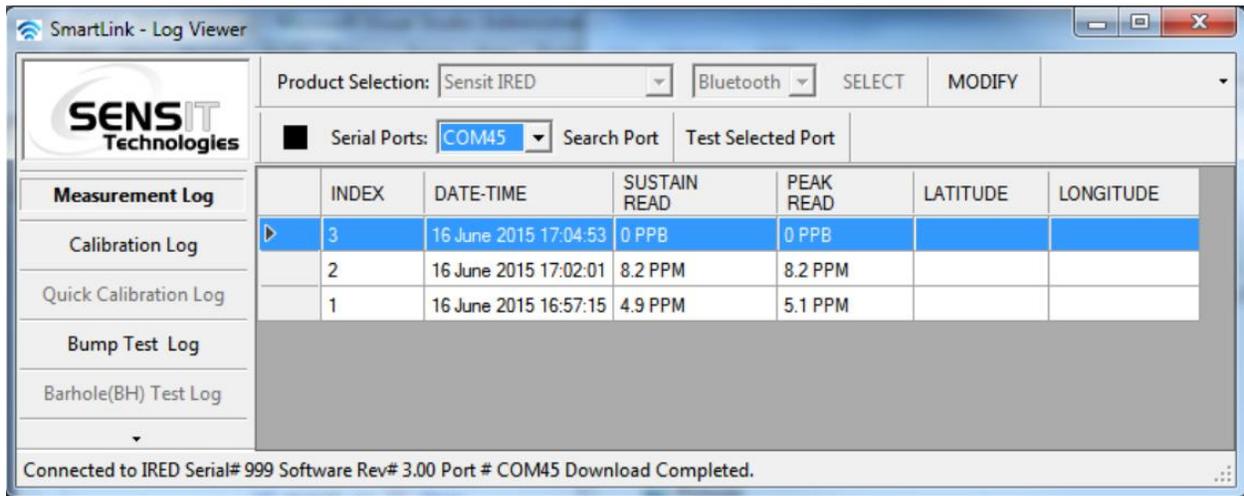
EXAMPLE. SEE FULL CHART ON THE NEXT PAGE.

Methane PPM	Expected Ethane PPM per Pipeline Ethane Percentage					
	1%	2%	3%	4%	5%	6%
50	500 ppb	1	1.5	2	2.5	3
100	1	2	3	4	5	6
150	1.5	3	4.5	6	7.5	9
200	2	4	6	8	10	12
250	2.5	5	7.5	10	12.5	15
300	3	6	9	12	15	18
350	3.5	7	10.5	14	17.5	21
400	4	8	12	16	20	24
450	4.5	9	13.5	18	22.5	27
500	5	10	15	20	25	30
550	5.5	11	16.5	22	27.5	33
600	6	12	18	24	30	36
650	6.5	13	19.5	26	32.5	39
700	7	14	21	28	35	42
750	7.5	15	22.5	30	37.5	45
800	8	16	24	32	40	48
850	8.5	17	25.5	34	42.5	51
900	9	18	27	36	45	54
950	9.5	19	28.5	38	47.5	57
1000	10	20	30	40	50	60
1100	11	22	33	44	55	66
1200	12	24	36	48	60	72
1300	13	26	39	52	65	78
1400	14	28	42	56	70	84
1500	15	30	45	60	75	90
1600	16	32	48	64	80	96
1700	17	34	51	68	85	102
1800	18	36	54	72	90	108
1900	19	38	57	76	95	114
2000	20	40	60	80	100	120
2100	21	42	63	84	105	126
2200	22	44	66	88	110	132
2300	23	46	69	92	115	138
2400	24	48	72	96	120	144

SMARTLINK SOFTWARE AND PLOTTING MEASUREMENT LOGS

The IRED automatically saves measurement, calibration, and bump test results in logs that are stored in internal memory on the instrument. These records can be retrieved via Bluetooth using SmartLink Software (included). For the measurement log, the information captured is: date and time of measurement, sustained reading, peak reading, and GPS latitude and longitude (if equipped with optional GPS feature). If GPS is equipped, these results can be viewed with the built-in mapping feature within the software, or saved as a .kml file to be viewed at any time with Google Earth or other applicable software.

For more information, and instructions on how to retrieve data from the IRED using SmartLink, refer to the help file in the software.



WARRANTY

Your Sensit IRED is warranted to be free from defects in materials and workmanship for a period of two years after purchase (excluding calibration). If within the warranty period the instrument should become inoperative from such defects the instrument will be repaired or replaced at our option.

This warranty covers normal use and does not cover damage which occurs in shipment or failure which results from alteration, tampering, accident, misuse, abuse, neglect or improper maintenance. Proof of purchase may be required before warranty is rendered. Units out of warranty will be repaired for a service charge. Internal repair or maintenance must be performed by a SENSIT Technologies authorized technician. Violation will void the warranty. Units must be returned postpaid, insured and to the attention of the service department for warranty or repair.

This warranty gives you specific legal rights and you may have other rights which vary from state to state.

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MADE IN THE USA
WITH GLOBALLY SOURCED COMPONENTS

SENSIT IRED Instruction Manual
Part#: 750-00061

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